

REMARKS

Claims 9-41 and 47-69 are pending in the application. Applicant expresses appreciation for the indication that claims 10-12, 19, 20, 23, 24, 34, 36, 49, 51, 60-63, 65-67, and 69 set forth allowable subject matter.

Claims 9, 13-18, 21, 22, 25-33, 35, 37-41, 47, 48, 50, 54, 58, 64 and 68 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Zenke (U.S. 6,258,690 B1) in view of Nogami et al. (U.S. 6,060,383). Applicant requests reconsideration.

Applicant notes that the rejection over Zenke in view of Nogami is nearly identical to the rejection over Zenke in view of Nogami and Bohling in the October 6, 2004 Office Action. The only significance difference appears to be the removal of Bohling as a relied upon reference. Aside from minor changes in the second to the last line of page 2 and the first line of page 3, the present Office Action makes identical allegations regarding the teachings of Zenke and Nogami in comparison to the October 6, 2004 Office Action. Applicant's "Response to October 6, 2004 Office Action" filed January 6, 2004 contains detailed assertions regarding the failings of Zenke and Nogami. Even so, the present Office Action does not take any note of Applicant's prior assertions or otherwise provide any answer to the substance of such argument. Applicant understands that the rejection is revised to no longer rely upon Bohling, but full consideration of and a reply to Applicant's assertions greatly assists in advancing prosecution and is respectfully requested.

Since the present Office Action does not take note of Applicant's prior assertions or otherwise answer the substance of them, Applicant herein largely reiterates the prior assertions along with added emphasis and clarifications. Applicant recognizes that claims 52, 53, 55-57, and 59 were previously withdrawn by the Examiner as allegedly

being directed to a species other than the elected species. Applicant submits herewith a petition under 37 CFR 1.144 requesting review of the restriction by the Director. Accordingly, Applicant requests consideration of such claims in the next Office Action and includes herein assertions establishing their patentability over the currently cited art.

Claim 9 sets forth a low selectivity deposition method that includes, among other features, forming a first part of a nucleation layer on a first surface of a substrate, forming a second part of a nucleation layer on a second surface of the substrate, and forming a deposition layer containing a chemisorbed first specie layer about one monolayer thick on the first and second parts of the nucleation layer. The deposition layer is formed substantially non-selectively even though the first and second surfaces of the substrate exhibit a property of the deposition layer forming less readily on the first surface compared to the second surface. Pages 2-4 of the Office Action allege that Zenke discloses every limitation of claim 9 except for forming the deposition layer to contain a chemisorbed first specie layer and relies upon Nogami as allegedly disclosing an ALD process suitable to form the claimed deposition layer. Applicant traverses.

Pages 2-4 of the Office Action allege that the motivation for modifying Zenke to substitute the LP-CVD discussed in column 5, lines 44-61 of Zenke with the ALD of Nogami is that the Nogami ALD constitutes an art recognized alternative method suitable to fulfill the purpose intended for the Zenke LP-CVD. However, regardless of whether the Nogami ALD is an art recognized alternative to the Zenke LP-CVD, Applicant asserts that no motivation exists to modify Zenke in the manner alleged by the Office. Specifically, no motivation exists to form silicon nitride film 6 of Zenke by ALD on silicon nitride film 5 of Zenke.

As may be readily appreciated upon review of column 2, lines 23-31 and column 2, line 66 to column 3, line 12 of Zenke, the problem addressed by Zenke is stated therein as unique to forming silicon nitride film 12 (or silicon nitride film 6) by LP-CVD. Because of growth thickness differences between portions of silicon nitride film 12 (or silicon nitride film 6) formed by LP-CVD on lower electrode 3 in comparison to silicon oxide film 2, a constricted portion 17 forms, promoting breakdown failure. Further, the entire purpose of providing silicon nitride film 5 in the manner described in column 5, lines 44-61 of Zenke is to remedy the described problems of forming silicon nitride film 12 (or silicon nitride film 6) by LP-CVD, as stated in column 3, lines 47-53 and column 4, lines 37-43 of Zenke. That is, if silicon nitride film 12 (or silicon nitride film 6) is instead formed by some method other than LP-CVD, then the teaching of Zenke (and Nogami) is that the problems described in Zenke will no longer exist.

Thus, no motivation will exist to form silicon nitride film 5 beneath silicon nitride film 12 or 6 if silicon nitride film 12 or 6 is formed by ALD instead of LP-CVD. Rather, those of ordinary skill would assume from the teachings of Zenke (and Nogami) that silicon nitride film 12 or 6 could be formed by ALD without silicon nitride film 5 and avoid the problems associated with LP-CVD of silicon nitride film 12 or 6. Applicant asserts that no motivation exists to form the Zenke silicon nitride film 6 by the Nogami ALD method over the Zenke silicon nitride film 5. The clear teaching by Zenke is that forming the Zenke silicon nitride film 6 by the Nogami ALD method will eliminate the problems associated with forming the Zenke silicon nitride film 6 by the Zenke LP-CVD. Accordingly, those of ordinary skill would form the Zenke silicon nitride film 6 by the Nogami ALD method directly on lower electrode 3 and silicon oxide film 2 without first forming the Zenke silicon nitride film 5. Those of ordinary skill would be motivated to

avoid formation of unnecessary layers (such as silicon nitride film 5) and would not form the obsolete silicon nitride film 5.

Applicant acknowledges that page 7, lines 4-20 and elsewhere throughout the present specification disclose that ALD can be complicated by thickness variations caused by changes in composition and/or surface properties of an underlying substrate. However, only Applicant's own specification and not the prior art recognizes such disadvantage of ALD. Neither Zenke nor Nogami recognize such disadvantage of ALD. Applicants acknowledge that judgments on obviousness may necessarily involve a reconstruction based in a sense on hindsight reasoning. However, such reconstruction can only take into account knowledge that was within the level of ordinary skill in the art at the time the claimed invention was made and cannot include knowledge gleaned only from Applicant's disclosure. In re McLaughlin, 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971); MPEP 2145(X)(A).

Accordingly, only the Applicant's own specification, and not the cited art, recognizes that a nucleation layer as set forth in claim 9 may be advantageously formed beneath a deposition layer containing a chemisorbed first specie layer. As such, Applicant persists in the assertion that no motivation exists to form the Zenke silicon nitride film 6 by the Nogami ALD method on the Zenke silicon nitride film 5. The Nogami ALD method is not a method suitable for the intended purpose of forming the Zenke silicon nitride film 6 on the Zenke silicon nitride film 5 since using such method would produce an unnecessary layer (silicon nitride film 5), according to the express teachings of Zenke in view of Nogami. Only the Applicant's own specification recognizes the advantages of the claim 9 method and no motivation exists to modify Zenke so as to suggest the claim 9 method.

Further, no evidence exists nor is alleged in the Office Action to exist in support of the proposition that the Zenke invention applies to deposition methods other than LP-CVD. Instead, Zenke merely teaches that the problem of forming a constricted portion 17 occurs in LP-CVD. The solution of forming silicon nitride film 5 under silicon nitride film 6 by LP-CVD thus does not appear applicable to the claim 9 method that sets forth forming a deposition layer containing a chemisorbed first specie layer about one monolayer thick. Zenke and Nogami do not teach any justification for the additional silicon nitride layer. At least for the reasons indicated above, claim 9 is patentable over the cited combination of references. Claims 13-18, 21, 22, 25-30, and 64 depend from claim 9 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 31 sets forth a low selectivity deposition method that includes, among other features, simultaneously forming a first part of a nucleation layer on an insulative oxide material and a second part of the nucleation layer on a semiconductive material and contacting the nucleation layer with an initiation precursor. The method includes forming an initiation layer about one monolayer thick on the first and second parts of the nucleation layer substantially non-selectively. As may be appreciated from the above discussion regarding the deficiencies of Zenke in view of Nogami as applied to claim 9, the cited combination fails to disclose or suggest every limitation of claim 31. Claims 32, 33, 35, 37-41, and 68 depend from claim 31 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 47 sets forth a low selectivity deposition method that includes, among other features, atomic layer depositing a nucleation substance chemisorbed on a first

surface and a second surface of a substrate substantially non-selectively. As may be appreciated from the above discussion regarding the deficiencies of Zenke in view of Nogami as applied to claim 9, the cited combination fails to disclose or suggest every limitation of claim 47. Claims 48 and 50 depend from claim 47 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 52 sets forth a low selectivity deposition method that includes, among other features, forming a first part of a nucleation layer on a first surface of a substrate, forming a second part of a nucleation layer on a second surface of the substrate, and forming a layer about one monolayer thick of a first chemisorbed precursor on the first and second parts of the nucleation layer substantially non-selectively. As may be appreciated from the above discussion regarding the deficiencies of Zenke in view of Nogami as applied to claim 9, the cited combination fails to disclose or suggest every limitation of claim 52. Claims 53-55 depend from claim 52 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 56 sets forth a low selectivity deposition method that includes, among other features, forming a first part of a nucleation layer on a first surface of a substrate, forming a second part of a nucleation layer on a second surface of the substrate, and forming a layer of a first chemisorbed specie at least one monolayer thick on the first and second parts of the nucleation layer substantially non-selectively. As may be appreciated from the above discussion regarding the deficiencies of Zenke in view of Nogami as applied to claim 9, the cited combination fails to disclose or suggest every limitation of claim 56. Claims 57-59 depend from claim 56 and are patentable at least

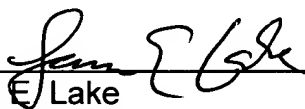
for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Applicant herein establishes adequate reasons supporting patentability of claims 9-41 and 47-69 and requests allowance of all pending claims in the next Office Action.

Further, Applicant submitted a Supplemental Information Disclosure Statement and Form PTO-1449 of which it does not yet have an initialed copy from the Examiner. This Supplemental Information Disclosure Statement was initially submitted to the U.S. Patent and Trademark Office on July 17, 2003. Review of the Office's PAIR Image File Wrapper indicates that the Office is in possession of the document. Applicant requests return of an initialed copy to the undersigned.

Respectfully submitted,

Dated: 06 Jul 2005

By: 
James E. Lake
Reg. No. 44,854